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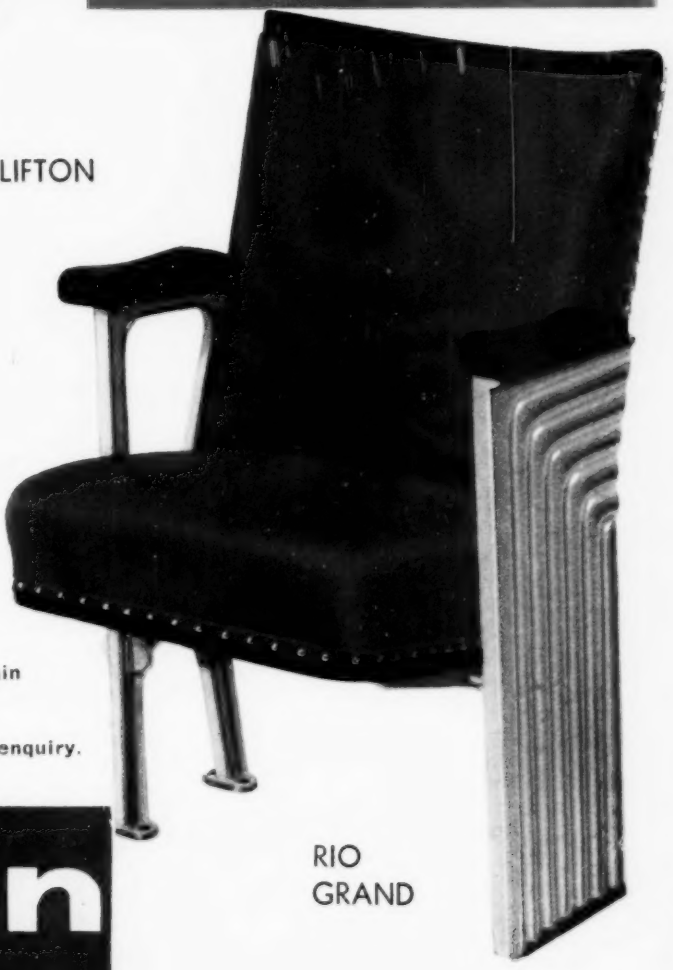

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The
IDEAL KINEMA

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At the BKS meeting when the Todd-AO 70-mm. projector was described in detail: R. R. Pulman, CMA projection engineer, Frank Durban, general manager, J. Frank Brockliss Ltd., W. J. M. Jansen, the lecturer, G. E. Fielding, ABC chief engineer, S. B. Swingler, CMA engineering controller, and Anthony Rigby, of Robert Rigby, Ltd.

BKS Discusses...

Todd-AO Multi-Purpose 70-mm. Projector

THE description of the Todd-AO 70-mm. projector which has already appeared in THE IDEAL KINEMA was elaborated at last month's British Kinematograph Society meeting, when W. J. M. Jansen, of the Philips factory in Eindhoven, Holland, gave a detailed specification. As already explained, the machine is capable of running either 35-mm. or 70-mm. film, the conversion taking only a few minutes.

The meeting attracted so much interest among members that it was a case of "standing room only."

The Todd-AO system, said Mr. Jansen, employs a 70-mm. film with a picture area of 2.074 in. x 0.906 in. It is provided with six magnetic sound tracks, two outside and one inside each row of perforations. The perforations are identical with those of standard 35-mm. film, but each frame is five perforations in height.

All sprockets carry two sets of teeth, the outer set with 20 teeth for 70-mm. and the inner set with 16 teeth for 35-mm. in the case of the intermittent, and 30 and 24 teeth respectively for the feed sprockets. Fire-trap and guide rollers are double-profiled to suit either gauge of film. The pad rollers for the intermediate feed and intermittent sprockets are fixed to the runner plate, and are therefore automatically removed with this plate for conversion, the one unit carries also the outer bearing of the intermittent sprocket shaft.

The sprockets are made of aluminium for lightness, coated by means of a special anodising process with an oxide layer of 60 microns thickness (about 2½ thou') giving a life equal to that of high-alloy steel.

The runner plate is curved longitudinally, so as to obtain a greater stiffness of the film in the gate. The runners support the whole width of film between the picture frame and the outer edges. Absolute steadiness of the picture is ensured by the fact that the film is completely guided on to the intermittent sprocket. Vertical jump does not exceed 0.15 per cent. and weave does not exceed 0.2 per cent.

When the gate is opened for threading, the runner plate is not moved and consequently the lens need not be shifted. A single-blade shutter is used, rotating at two turns per frame. Close behind the gate aperture is a light cut-off operated electro-magnetically, which is used as both change-over and safety shutter.

The magnetic soundhead has two drums with heavy flywheels. The magnetic cluster is located between these sound drums, and has ten cores, six for Todd-AO and four for CinemaScope. The response curve is flat to within ±2db up to 12 kc s.

The projector is driven by a split-phase asynchronous motor via V-belts and two pulleys, either of which can be coupled to the shaft to change the film speed from 30 to 24 frames per second. The horizontal shaft drives a vertical main shaft from which all components are driven, in each drive one of the gears being made of Novotex for silent running. Framing is effected by rotating the complete intermittent mechanism round the Maltese cross axis.

The special all-purpose amplifier is suitable for the reproduction of: (a) 6-track Todd-AO; (b) 4-track magnetic sound; (c) single-track magnetic sound and (d) single-track optical sound. Provision is also made for a Perspecta-Sound integrator.

The equipment is built in a twin 19 in. rack. The right-hand part contains the power amplifiers and monitor, and the left-hand part all the pre-amplifiers, power-supply units and further auxiliary equipment. All pre-amplifiers are of the plug-in type for easy replacement, and each has provision for checking the valves. Reserve pre-amplifiers are provided for both optical and magnetic sound, and the power units are also duplicated.

The master control panel is equipped with selector switches for choosing magnetic or optical, for choosing either of the optical pre-amplifiers, any two or three projectors, for DC or AC feed to the exciter lamps, for selecting the magnetic system to be used and for monitoring any one track, and provision for stand-by connections.

The speaker system has a cross-over point at 500 c s, and a maximum distortion is claimed of less than 2 per cent.

R. R. Pulman mentioned that the American press had referred to automatic focusing.

Mr. Jansen explained that actually it was a focus drift compensator; because of the size of the lenses used, and their short focal lengths, the refraction varies as the lens heats up. A small motor adjusts the lens in accordance with a preset characteristic, so that it remains in focus; at the end of the performance the lens is automatically shifted back to the original position.

Replying to A. Duerdoth, the lecturer stated that it had not been found possible to devise optics producing an elliptical gate spot; he agreed there was considerable loss of light. He told Mr. Townes that the depth of focus was such that the picture remained sharp with a screen curvature of 13 ft.

Mr. Jansen discussed with A. E. Ellis the problem of film life; he pointed out that the higher speed of the film meant that it was exposed for a shorter time to the heat of the arc. A copy of "Oklahoma!" had been run for nearly 50 weeks. All prints were waxed.

Replying to Mr. Townes, Mr. Jansen agreed that a metallised screen was unsuitable because of the deep curvature which would cause re-reflection. A screen specially developed in America had deep ribs about 1-mm. apart; the light was trapped between the ribs.

Publicity Design

WE would like to endorse Mr. Rosenthal's complaint in his article "Bad Publicity Can Kill Design" (*The Ideal Kinema*, January), that lettering on cinemas often appears as an afterthought where it could make a strong contribution to the composition of the elevation.

For years this association has been urging architects who are engaged to design commercial buildings to consider the provision of illuminated signs at a very early stage of the design, so as to ensure that such signs form an integral part of the building and blend in with its appearance.

Many architects, we are glad to say, accept the wisdom of so doing, but unfortunately many others will persist in ignoring the question of signs with the result that not until the building is completed is a sign contractor engaged. This, of course, is much too late. If the signs are to really form part of the building the architect should bring in the sign contractor at a very early stage.

BERNARD MOSS,
The Electrical Sign Manufacturers' Association,
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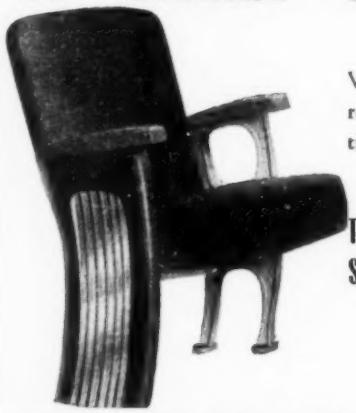

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THE IDEAL KINEMA Supplement to KINEMATOGRAPH WEEKLY February 14, 1957

Simple in Planning and Decoration

The Savoy, Paddington

FIRST new independent cinema to be opened this year, the Savoy, Paddington, grew from the ruined shell of the old Grand Cinema on the same site, which was almost entirely destroyed by enemy action during the war.

All that remains of the old building is the frontal elevation, but this, of course, has been repaired and redecorated. The reconstruction has increased the seating capacity from 800 to nearly 1,100. Two notable additions have been made to the front of the house. A new approach staircase outside has been installed in terrazzo; and a modern canopy has been fitted, carrying a combination of floodlights and tungsten down-lighting. In addition a neon sign has been placed so that the name of the cinema is clearly visible to people coming out of Westbourne Park station about a quarter of a mile away.

The entrance doors have been renewed in teak, with glass panelling. This style is carried through to the sales kiosk and pay-box, which are also of teak below glazing.

The foyer is small but airy. It has a floor of light, straw-coloured terrazzo, with silver grey walls and grey ceiling, the lights being a combination of direct and indirect.

Extreme simplicity in design and decoration has been achieved in the auditorium, which is entirely devoid of any of the traditional "embellishments." Up to a height of 4 ft. the side walls have been covered with a somewhat unusual asbestos corrugation in royal red, with a mahogany skirting and a mahogany, scalloped strip as a top rail.

Plain Walls

Above this the walls are plain silver grey, broken at intervals by bucket-shaped indirect light fittings made of fibrous plaster. The only decorative features are on the apron walls on either side of the proscenium; these have plaster star motifs in alternate colours—red and blue.

The proscenium itself is also of fibrous plaster, and large wrought-iron grilles on either side provide inlets for the plenum system. Other air inlets are in the footlights and at the rear of the stalls and circle.

A fibrous plaster ceiling has been installed in suspension and the double core stands free of the main ceiling, which is stepped over the balcony, thus giving facilities for further recessed lighting.

The ceiling itself is sky-blue in colour, and tones well with the silver grey walls, but, over the proscenium a vivid contrast has been provided by painting a transverse panel in royal red, bearing in the centre a large "Pegasus" in gold.

Front of the balcony has been treated with acoustic tiles, enlivened by fibrous plaster shield motifs.

A 30 ft. screen can accommodate anamorphic and wide-screen systems.

The screen and exit curtains are somewhat unusual. Johnson's (Bournemouth) Ltd., was responsible for making, supplying and fixing the stage curtains and festoon border, which are made of a grey glass fibre material, that is, of course, completely fireproof, and has light-reflecting qualities not usually obtainable in fire-proof fabrics. When opened, the curtains draw off on a curved curtain track on to the side walls so as to avoid interference with the sight lines from the side stalls. The same firm also supplied and fitted the linoleum in the stalls, and fitted the carpet and the exit door curtains and pelmets.

Architect:
R. Seifert, ARIBA

The theatre was furnished throughout by H. Lazarus and Son, with 1,094 of the company's "Everest" design tip-up chairs, upholstered in red moquette.

BTH Sound Equipment, Ltd., has supplied the complete sound and projection equipment for showing wide-screen, optical CinemaScope and single-track magnetic CinemaScope films.

The arc lanterns, BTH type H, operating at from 50 to 65A, have auto strike and auto focus features as well as the usual autofeed. The BTH projectors are fitted with swinging anamorph lens brackets carrying Wray variable anamorph lenses, and quick change lens adapters is the focusing mount, carrying Wray wide screen and CinemaScope backing lenses. BTH rotary magnetic soundheads are fitted for optical tracks and BTH Supaphonic soundheads for magnetic track reproduction.

The Supaphonic soundheads utilise two drums, each with its associated flywheel and two spring tension rollers. The magnetic pick-up is mounted between the rollers and the output from the pick-up head on each machine is taken to its own pre-amplifier which in turn feeds into the standard fader through a magnetic/optical selector switch.

The main amplifier is of 35 watts undistorted output and feeds into a dual channel loudspeaker system comprising loudspeaker filter with change-over frequency of 500 cycles, high frequency units with 9-cell horn and low frequency units in twin folded baffle.

The whole equipment is extremely versatile, permitting any of the main standard types of current release film to be shown in the same programme.

The heating and ventilating system by Edward Dean and Beal, Ltd., is arranged to provide a constant supply of filtered, washed and warmed fresh air throughout the building. Background heating is provided by radiators, and the complete plant is served by automatic, oil-fired boiler equipment.

Furnishings

PLEASING design and colour schemes play an important part in creating an atmosphere of comfort in a cinema. The March issue of "The Ideal Kinema" will contain a special section devoted to this subject, in relation to furnishings and curtains, including expert advice on choice of colours and materials, and a survey of the products and services available.

The auditorium of the Savoy, Paddington, showing the extreme simplicity of the design and decoration

British Equipment Abroad

THE Gaumont-Kalee Division of Rank Precision Industries, Ltd., was responsible for the major installation of equipment at the J. Arthur Rank Organisation's Streits Cinema, Hamburg, Germany. The theatre is provided with Gaumont-Kalee "Shirwood" chairs, with Dunlopillo seats; and more than 1,000 yards of carpeting in a Hogarth pattern, cherry shade.

Projection equipment includes two Gaumont-Kalee "21" projectors with 3,000 ft. spool boxes and "President" arc lamps and stands. Gaumont-Kalee model 83 sound-heads are used, GK "18" dual channel amplifiers and a No. 1 Duosonic loudspeaker.

FIRE DAMAGE REPAIRED

REINSTATEMENT after damage by fire at the Assembly Hall, Barry, includes new ceilings in metal rib lath and plaster; suspended ceilings; solid and fibrous plasterwork; acoustic tiling; safety curtain; stage gear and curtains; and specialist joinery work and decorations. This work was carried out by Modernisation, Ltd., and is one of several contracts executed by the company since January this year.

Other contracts include a new canopy at the Carlton, Maryport; a new wide proscenium, interior renovations and decorations, and exterior painting at the Triangle, Birmingham; interior decorations at the Regal, Harringay; at the Assembly Hall, Worthing, complete interior specialist decoration; interior and exterior decorations at the Kings cinema, Heswall; and interior decorations at the Palace, Witney.

At the Savoy, Newark; Roxy, Ashby; Picture House, Hebden Bridge; and Savoy, Worksop, Modernisation, Ltd., has installed new sales kiosks.

Village Wide-Screen

THE tiny village cinema in Llanbadoc, Monmouthshire, which opens for four days a week, can now claim to be one of the smallest in the country to have a CinemaScope screen installed.

From now on, patrons of this 180-seater, run by Melvin Lewison, can enjoy nearly all the amenities of a modern super cinema.

Mr. Lewison installed the screen himself, and launched it with "There's No Business Like Show Business."

The size of the screen in the hall has now more than doubled. It used to be ten feet wide. Now it is 21 ft.—only three feet short of the total width of the building. The height remains nine feet.

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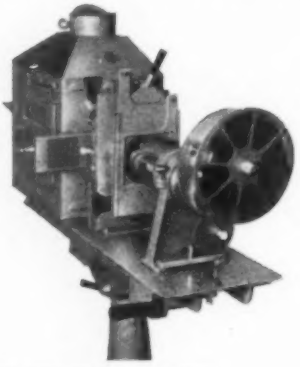

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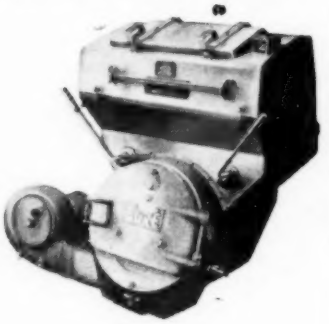

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HEATING WITHOUT TEARS

by Arthur Spencer-May

FOR some years I had suffered the vacillations of a natural-draught, hand-stoked boiler, where, half the time, the temperature was either too high or too low; and at last decided that automation must come.

All the known methods were considered for the Commodore, Orpington, and, last summer, I installed a Swedish invention called the Suxé Firing Unit, made in this country by the Hemel Hempstead Engineering Co. This was installed last summer, and up to last month was showing approximately 30 per cent. saving of fuel, and a 45 per cent. saving of fuel costs, because a cheaper grade can be used.

This firing unit is placed outside the existing boiler and consists of a furnace, fuel hopper and electric fan. The fan induces a forced draught through the coke fuel in the burner and a secondary draught over the top of the blazing fuel burns the waste gases. The flame is directed through the aperture of the stoking doors of the boiler and sealed externally by a plate: the boiler in this case has a capacity of 800,000 BTUs per hour and supplies heat for a plenum system, dealing with 12,000 cu. ft. of air per minute, and 37 radiators, the latter heating the offices, café, toilets and corridors.

The Suxé burner is water-jacketed, connected in parallel with the heating system and is fully automatic, no boilerman being required, although, of course, some small attention is needed for clinkering and recharging the hopper.

This particular firing unit has been tested by the British Coal Utilisation Association and, for ¾ in. x 1¼ in. coke, it gave a figure of efficiency from losses of 86.4 per cent.

Experts Confounded

Combined with the firing unit at the Commodore is an interesting system of automatic control. It was told by a prominent engineer that this is impractical on a plenum method of heating a largish auditorium, because of the time lags. Nevertheless, it has been installed and is working satisfactorily.

The principle is simple. For heating up the auditorium the boiler is run up on a water control thermostat to 140 deg. Fahr. The plenum system is then put into operation, 1½ hours before the show starts, and, at the same time, control is switched to air thermostats.

Phase one is to heat the auditorium: the system delivers air at 78-80 deg. regulated by a thermostat placed in the inlet air duct.

Phase two is when the hall has reached 64 deg. (or any other predetermined temperature desired) and the temperature of the air coming into the auditorium is then automatically reduced to about 70 deg.

This is brought about by another thermostat placed in the air extract stream (after all, the air being taken from a theatre should be at the same temperature as the air in it). This takes control away from the heating up "stat," and transfers it to another "stat," which is also placed in the inlet duct.

In normal working this temperature of 70 deg. overcomes the heat losses of the cinema (a 1,000-seater), and results in a final hall temperature of about 67 deg.

Phase three caters for capacity working and more temperate weather: another set of thermostats, operating in the same way, bring the inlet temperature down to 65 deg. if the auditorium temperature exceeds 67 deg. It thus prevents a common fault of overheating when the house becomes well occupied.

These controls work very well in practice: they save endless trips to the boiler house, and one knows that when a few people come into the cinema the boiler temperature will be reduced in time to the right degree.

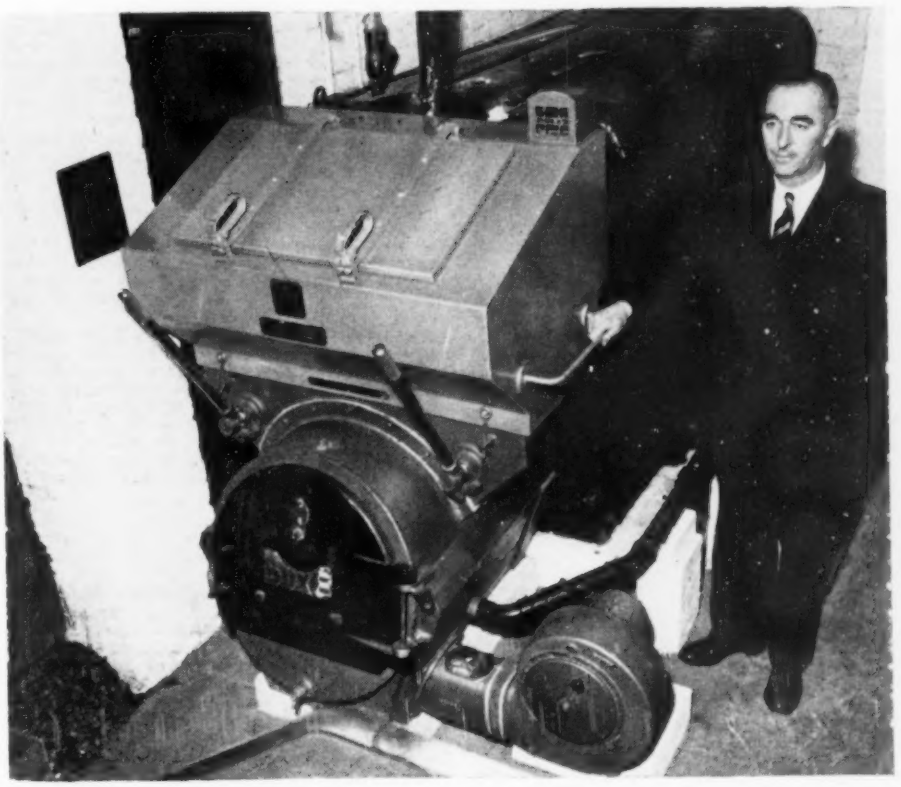
As regards the radiators, also run off the same system, it may seem unfair to them that the temperature also goes down on those rare occasions when the "Standing Room Only" notice is up.

In practice, however, no disadvantage is felt: on a cold or coldish day there is some heat in them at the worst; and the preliminary heating-up periods at high temperature seem sufficient for warming the offices and café. Afterwards, waste heat from the auditorium seems to maintain all parts of the building at a comfortable temperature.

If, however, it was deemed necessary to run radiators at a consistently high temperature, the boiler could be run at a pre-set stable temperature and variations to the auditorium heating achieved by a modulating valve on the plenum heating battery flow. This would entail about a 25 per cent. increase in the installation cost and would mean a slightly higher running cost.

Practice has proved that neither expense would have been justified at the Commodore.

NOTE: Mr. Spencer-May's heating system described above appears to be a model of its kind. The method of thermostatic control is logically and scientifically sound, and the fact that practice has confounded the expert theories on the question of time lag is probably due to the excellent proportions of the basic system which obviously provides that abundance of heating that is so desirable but is so seldom provided.—**Graham Clarke.**



Arthur Spencer-May beside the Suxé Firing Unit installed on his heating boiler at the Commodore, Orpington

For All Electrical Reference

NOW in its fifty-ninth year, the freshly revised 1957 edition of *The Practical Electrician's Pocket Book*, 1957 (Odhams Press Ltd., 5s. 6d.), being all that its name implies, is a vade-mecum of modern electrics and something that all engineers and technicians should own.

For easy reference the book is divided into a number of chapters, each of which deals with the theory and practice of the various fields of electrical installation work.

The introductory chapter on "Recent Developments," a review of progress of the past year, contains much of value in regard to wiring practice and includes sections on pilot lights, control units, miniature circuit breakers, ring circuits and cables. Of particular interest to electronic enthusiasts is the chapter covering transistor theory and the operation and maintenance of transistor circuits.

There is, of course, a comprehensive treatise on artificial lighting covering all aspects of this all-important service in a concise and fully illustrated manner.

A diagrammatic wiring layout illustrates the switchgear and fuseboards required for a typical large installation. There are chapters on water and space heating and readers are given full details on the various methods adopted and the equipment used for obtaining the desired result.

The sections on the more modern applications of electrically-warmed floors and thermal storage heaters will bring engineers up to date in these ever-developing fields.

The last chapter on accumulators completes an admirably produced work which should certainly find a place in the library of every practical electrical man.

Talking TECHNICALLY

ANY move towards a reduction in the number of different types of prints which at present afflicts the industry should be welcome. This will be the effect of the new Mag-optical print, which during the next few months, Twentieth Century-Fox will have available.

The new print has been approved by the Motion Picture Research Council, and the official drawing reproduced shows that it is simply a 4-track CinemaScope print with "fox-hole" perforations and a half-width optical track.

L. F. Rider, Twentieth Century-Fox CinemaScope engineer, believes the new print will in time completely supersede the existing 4-track magnetic print. Its major advantage is not technical but economic: at present, early bookings of a film need chiefly magnetic prints, while subsequent bookings need chiefly optical. Because of the lack of balance, it often happens that bookings have to be delayed because of the non-availability of optical prints.

But in future the Mag-optical print will service the first-run bookings as magnetic, and subsequent runs as optical, so that the exhibitor who is equipped for running it will not find his bookings delayed because of lack of prints. However, it is not proposed to abolish optical prints; exhibitors who think the cost of conversion not worth while will be under no compulsion to undertake it.

Obviously the new print requires projectors and soundheads to be fitted with CinemaScope type sprockets, together with a 2.35 to 1 aperture plate; so that projectors equipped for optical CinemaScope may need new sprockets. For running the new prints on projectors equipped for 4-track magnetic, the 2.35 aperture plate must be used, with the same centring of the picture as for optical CinemaScope or wide-screen.

The optical track is only half the normal width, so that the signal/noise ratio will be 6 db. down, and one would expect to have to run with the fader 3 steps higher; but Mr. Rider told me of numerous tests he had made, which showed that the new prints need to be run only 2 fader steps up, and the quality of sound is practically indistinguishable from that of a full optical track. Naturally, the exhibitor who demands the highest quality of sound without the cost of 4-track should install a single-track magnetic head.

I also had a word with Anthony Rigby on the subject of splicers. He considers that a new splicer will be necessary for those rewind rooms not already so equipped. Older type splicers give generally a $\frac{1}{8}$ in. join instead of 3/32 in., are not non-magnetic, and have pins the wrong side. It is not satisfactory just to file the pins of an old type splicer, since only one of the pins is made to fit the perforation, the other being smaller to allow for film shrinkage.

IN reviving memories last month of earlier issues of THE IDEAL KINEMA, I should have made mention of the film mutilation campaign, which I began in 1933, and which, over a period of years, undoubtedly had an important effect in improving the condition of prints. Those projectionists who complain of print condition today little realise how much things have improved in 20 years.

However, the West Country, I must confess, still remains a black area. From J. M. Miller, chief of the Tivoli, Tiverton, comes a letter which really belongs to earlier days. Says Mr. Miller: "1956 has been a great year for the film industry; films have been better, CinemaScope and VistaVision are here to stay. But why, oh why, do printers forget to put cue dots on films in this modern age?

"At home I have a little book, in which are quite a few bits of film, not pin-ups, bare legs or what else people see to cut out, but all bits of film it has been my lot to have to cut out to ensure a reasonable show.

"It makes my blood boil when I come to the end of a reel and see punched holes, dirty scratches, words—all on a poor bit of flimsy film that has done nobody any harm, and more often than not has a perfectly good cue dot in the right space. The people who do this are a disgrace to the trade, and should never claim to be projectionists.

"There is one cure: for all renters to check films after each run, and to cut out cross-overs, then they will catch the people concerned in this type of thing."

Mr. Miller sends a dozen horrible examples. Unfortunately, he does not give me the names of the films from which the cuttings were taken, so there is little I can do other than to publicise his complaint.

I would not say that poor print condition is necessarily the fault of West Country projectionists. There are, let's face it, few first-run theatres in that territory, and I have occasionally suspected that the renters, when they receive the prints back from the London runs, pick out the better ones for the key theatres and save the less good ones for the West Country, and, I may add, East Anglia, where conditions are very similar.

A REGULAR suggestion from projectionists for the improvement of the standard of print condition is the issue of report sheets, to be completed by the projectionist on receipt of the copy. But what happens when a renter follows this advice?

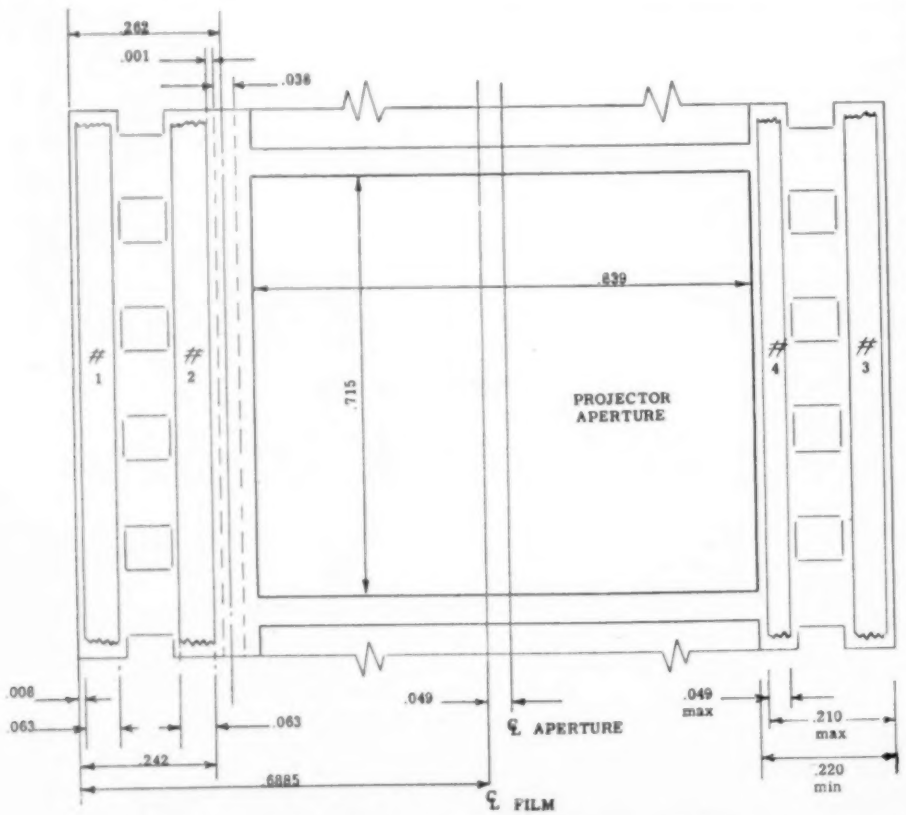
The answer was given in a letter published in the KINE. from Francis Howard, technical manager of Films de France, Ltd., who complained that a very small proportion of such forms were returned to him. I contacted him, and received a copy of his report form—a perfectly simple form, asking only for the name of the cinema, title of the film and copy number, with one line to report on each reel, and a space for a general condition report and another for remarks.

Says Mr. Howard: "The percentage of returned film condition reports is frustratingly low—certainly not more than 10 per cent. The report itself is in most cases placed inside the can of reel one. Of course, where such a film as 'Mam'zelle Pigalle' is on a circuit release there are many cross-overs, and the copies do not come back to London. There are certain cinemas, such as the New Victoria, Nottingham, who send a report back to me direct, immediately after the chief operator's inspection of the copy. Such help is invaluable, but it is all too rare.

"Many of the returned reports are incomplete in the following respects: (1) No copy number; it is true with much trouble I *can* find the copy number, but this is difficult with cross-overs. (2) No 'Name of Cinema'—again it can be found with a good deal of rummaging. (3) There have been occasions when the title of the film has not been shown."

Mr. Howard mentions an instance of film damage which it would be unwise for me to repeat, and concludes: "Having myself managed for some time one of the most exclusive cinemas in the world, where the standard of projection is very high indeed and where copies in first-class condition are essential, I decided to try and keep up a reasonable standard with this company's films, but the lack of co-operation is depressing to a degree."

There was a time when I held the renters chiefly to blame for poor print condition. But today one can, I think, say that, without exception, print managers do try to give the best possible service to the projectionist. I should like to think it is only a minority of projectionists who fail to respond—but Mr. Howard's letter makes me doubtful.—R. H. C.



Official diagram of dimensions of the 20th Century-Fox Mag-optical print

Design For Heating and Ventilating

by A. Wightman, AMIHVE

SATISFACTION at the box-office is closely related to the physical comfort of the patron within the auditorium.

Skilful design and manufacture of seating accommodation usually ensures a restful reception, but the condition and operation of the heating and ventilation equipment all too often detracts from the other amenities offered.

The provision of these essential services is subjected to very close scrutiny by County Councils, and, generally speaking, they are sufficient, but rarely abundant, for the required purposes.

Three Classes

The majority of systems fall into three classes:—

1. Heating and ventilation combined by the plenum system, with the addition of radiators in auditorium and other parts of the building.
2. Heating and ventilation combined by the plenum system, with no direct radiation heating.
3. All heating by radiators and/or pipecoils, with extraction ventilation.

System No. 1 is the ideal although it is the most costly to install. Prior to opening, the cinema can be warmed, to the extent of heat lost through the structure, by the radiators.

Conditioned and warmed air is introduced via the plenum system, and, for ventilation, the volume of air, both inlet and extract, can be regulated to the number of patrons.

A careful balance must be maintained between air volume and internal temperature. Unless integral instrumentation is provided, the call for a maximum inlet air volume to reduce temperature in a "full house" may reverse the desired effect, since more heat is introduced with the larger volume of air.

Inversely, a tendency exists to run the plenum plant at the lowest speed, which results in a higher air temperature from inlet air grilles. At first sight this appears a wise course. In fact, the total heat input is reduced, and is often insufficient to cope with structural heat losses and to raise the temperature of incoming air.

Care Needed

With system No. 2 all heating is effected by the introduction of warm air to the auditorium, foyer, etc.

Most careful technical design is called for to avoid wide variations in temperature over the several parts of the cinema. In the majority of cases the incoming air is heated to a predetermined temperature at the plenum chamber. It follows, therefore, that this temperature must be employed at all air grilles, irrespective of required volume, and it is sometimes found that discrepancies occur in either the standards of ventilation or heating.

The system under heading 3 is found in the earlier and smaller cinemas. Whilst heating is usually sufficient, chiefly because night banking of the boiler provides a moderate heat input and the auditorium rarely gets cold, little provision is made to introduce fresh air.

In a small cinema, the atmosphere frequently becomes smoky with a "full house," and clearance has to be effected by the extraction fan. The air drawn out is mostly replaced through doorways, and draughts may result.

The heating systems thus briefly described are usually designed with low pressure hot water as the heating medium, and the majority have accelerator pumps, to ensure circulation to all parts of the system.

Steam is rarely used in this country, chiefly due to the difficulty in maintaining correct pipe levels, and the necessity for close attention to stoking.

Solid fuel has been the most popular method of firing, either by hand stoking or by various types of automatic stoker.

In recent years, however, a considerable number of conversions to oil firing were undertaken, and advantages have been noticeable where a boiler attendant's services were unobtainable.

Gas firing for hot-water boilers is a very trouble-free method, calling for practically no specialised attention. Up to the present this method has not been in the forefront, as fuel costs are usually high in relation to solid fuel and oil; but developments in gas production are expected to reduce the gap in these costs.

Electricity is not used to any great extent for heat generation in cinemas.

Comparisons

Approximate comparisons in the amount of heat purchased for a unit of money are given below for solid fuel, oil and gas. It must be appreciated, however, that basic costs vary in different parts of the country, and numerous grades of solid fuel and oil are obtainable, these varying in price and calorific value. Gas is usually provided at a calorific value of 500 BTUs per cubic foot—(100,000 BTUs per therm).

(*a*) *Solid fuel.* (Hand firing.)

Assume No. 2 size coke.
Calorific value—13,000 BTUs per lb.
Cost per ton—£8 10s.
Resultant boiler efficiency—60 per cent.
Heat purchased for 20*s.*

$$\frac{2{,}240\text{lb} \times 13{,}000\ \text{BTU/lb} \times 60\ \text{per cent. efficiency}}{£8\ \ 10\text{s. per ton}} = 2{,}055{,}530\ \text{BTUs.}$$

(*b*) *Solid fuel* (Automatic stoker.)

Assume Anthracite beans.
Calorific value—14,000 BTUs per lb.
Cost per ton—£10.
Resultant boiler efficiency—70 per cent.
Heat purchased for 20*s.*

$$\frac{2{,}240\text{lb} \times 14{,}000\ \text{BTU/lb} \times 70\ \text{per cent. efficiency}}{£10\ \text{per ton}} = 2{,}195{,}200\ \text{BTUs.}$$

(*c*) *Oil.* (Fully automatic at boiler.)

Assume 200 seconds viscosity.
Calorific value—19,000 BTU/lb.
Cost per gallon—1s. 4d.
Specific gravity—0.94.
Resultant boiler efficiency—75 per cent.
Heat purchased for 20*s.*

$$\frac{9.4\text{lb/gall} \times 19{,}000\ \text{BTU/lb} \times 75\ \text{per cent. efficiency}}{1\text{s. 4d. per gallon.}} = 1{,}510{,}710\ \text{BTUs.}$$

(*d*) *Gas.* (Fully automatic at boiler.)

Assume Town gas.
Calorific value/cubic foot—500 BTUs.
Cost per therm (200 cubic feet)—1s. 6d.
Resultant boiler efficiency—80 per cent.
Heat purchased for 20*s.*

$$\frac{500\ \text{BTU/cubic feet} \times 200 \times 80\ \text{per cent. efficiency}}{1\text{s. 6d. per therm.}} = 1{,}066{,}660\ \text{BTUs.}$$

Particular attention is drawn to the quoted calorific values, costs and resultant boiler efficiencies, as these are of an arbitrary nature, and must vary according to the nature of the fuel, districts, and attention given to firing or maintenance of plant.

Incidental Costs

Careful consideration must be given to the incidental costs that are incurred in operating the various methods of firing described.

In the case of solid fuel (hand firing) one must consider source of supply, period of delivery, and storage of coke in suitable conditions. Removal of ash and clinker, and apportionate cost of labour; and depreciation of site in vicinity.

If using anthracite beans in an automatic stoker one must consider source of supply, period of delivery, and storage in suitable conditions; removal of ash and clinker, and apportionate cost of labour; depreciation of site in vicinity; replacements of working parts, usually carried out by resident staff; and cost of power for electric drive.

When oil is used points for consideration are source of supply, period of delivery, and maintenance of fuel tanks, and fitments; periodic inpection and overhaul of burner equipment, and cost of power for pre-heating oil (if 200 seconds or over) and electric drive.

Labour Saving

Usually, the only maintenance on a gas boiler is a quarterly cleaning of flueways and burners. In certain types of tubular boiler, however, the firing tubes require replacement after some years of service.

It will be gathered that oil and gas-fired systems require little allocation for labour costs; and, in the case of larger cinemas, this can contribute substantially towards the higher cost of fuel.

Few cinemas have been constructed since the 1939-45 war, and it follows, therefore, that most have been operating for 20 years or more. Such a period represents a reasonable life for a large portion of heating and ventilation plant, and the matter of repairs and replacements is one before most managements.

Think Ahead

It is important that work to be carried out on heating plant should be considered at the earliest date after the end of the season, to avoid dislocation during the season.

In this matter, the reports of insurance inspectors are of great value.

Many air heating batteries, particularly those with ferrous fins, have corroded to such an extent that little heat is emitted to the air entering auditorium, with consequent waste of fuel.

It is important, too, that the air space between fins should be cleaned regularly, as a minute layer of dust can form a most effective insulation, and again reduce the air temperature to the auditorium. After a number of years, air washer eliminator plates may corrode, and no longer form a barrier to dust particles, which are carried through to the air battery and ducts. These plates should be replaced.

Air washer settling tanks should be cleaned and painted at least once per year to resist corrosion.

These are just a few of the important points in care and maintenance which are mentioned here because they are not obvious and are, therefore, liable to be overlooked.

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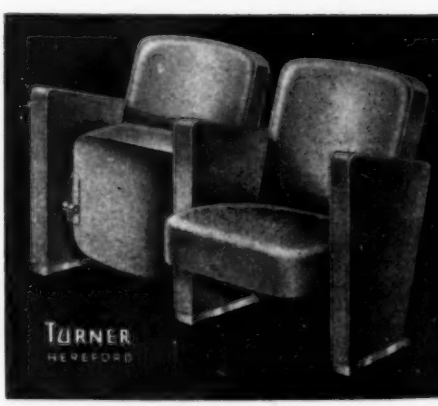


HEATING SERVICES . . .

These firms, specialising in heating and ventilating, can help you to keep your cinema warm and well aired whatever the outside temperature

John Evans (S. & H.) Ltd.

FOUNDED in 1905 and incorporated in 1928, John Evans (S. & H.) Ltd., of Euston Road, London, has been specialising in cinema heating and ventilating since 1930. The company now designs and instals complete systems of heating and ventilation for all classes of new cinemas and theatres in addition to modifying existing equipment and fitting warm air units, extract fans, oil burning equipment, thermostatic controls, etc. Recent developments include controlled air distribution and automatic control of interiors.

The plant installed in a recently completed cinema, includes two oil-fired boilers with large oil storage tank. The quiet plenum plant delivers air at high velocity through directional grilles on stage level, the air temperature being controlled by a concealed thermostat in the delivery duct. The auditorium radiators are governed by a thermostat which automatically shuts down radiators at a predetermined temperature thus preventing overheating, which so often occurs with a full house, and at the same time saving fuel.

The company is now devoting considerable time devising methods of meeting local authorities' requirements in the matter of ventilation and in recent months has modernised existing equipment in several cinemas at reasonable cost.

Hurseal Ltd.

WALL radiators are a valuable and acceptable method of space heating and it has been claimed that the thin panel radiator, such as those made by Hurseal, Ltd., give a suitable balance of radiated and convected heat.

If, however, there is not sufficient space for this method, then column models can be used.

These two types of radiator are operated by hot water, but, for cases where a heating boiler is not a practical possibility, Hurseal also supplies oil-filled electric radiators: this method, of course, eliminates nearly all expenditure on maintenance.

J. Jeffreys & Co., Ltd.

SINCE the days when gas radiators were used to warm the auditorium, and propeller fans were used to extract the vitiated air, J. Jeffreys and Co. has specialised in cinema work.

The firm is still giving the industry its specialised knowledge with the installation of modern plant involving centrifugal fans, air washers, ducting, heating batteries and scientifically arranged inlet grilles. A typical ventilation plant in London, for instance, will deliver 1,000 cubic feet of air an hour for each patron while the cinema is operating; the heat is generated by a central boiler plant, usually oil-fired and automatically controlled; and vitiated air is extracted through grilles in the ceiling, connected by ducting to a centrifugal fan discharging outside the building.

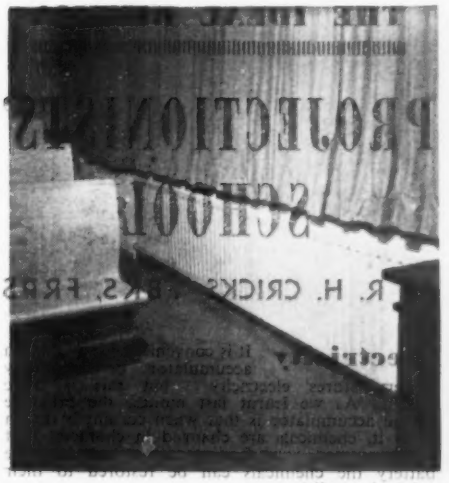
Vent-Axia Ltd.

IT IS claimed by Vent-Axia that most ventilating problems can be solved by this simple form of unit ventilation.

The units are electrically driven and are suitable for fitting direct to the glass of windows (in cinema cafés, for instance) or to fixing plates for wall, partition or roof mounting.

Intake, extract and reversible models are all available in four sizes, and attachments include iris shutter, weather cowl, air excluder, dark room attachment, air flow deflector, grille and guard.

A free technical advisory service is available throughout the United Kingdom.



A typical Hurseal-Gulf panel hot-water radiator wall mounted

Lamps and Lighting

Tungsten is Adaptable

by "Luminaire"

IN spite of the many undoubted advantages of fluorescent tubes, there is no slackening in the demand for tungsten lamps since, generally speaking, they offer the designer greater scope for the creation of decorative effects at lower initial cost.

For luminous elements such as artificial daylights and windows, cornices and coves, efficient tubular sources are ideal. For individual luminaires, however, the present range of pear-shaped, round bulb and candle type tungsten lamps, plus a variety of diffusing materials and metal finishes provide unrivalled adaptability for the interior designer.

Opal glassware, for instance, easy to wash and of perfect diffusive quality, is now available in an almost unlimited variety of shapes. Finished designs must be practicable though, and the main points to look for are ease of lamp replacement, facilities for simple removal of globes or shades, avoidance of overheating and non-complicated methods of mechanical fixing and electrical wiring. If tubular metal suspension rods are desired, a ball, swing joint embodied in the ceiling plate is advised. The latter, of course, should have holes drilled for securing to a BSI conduit box.

As luminous efficiency is secondary to aesthetical effect and the creation of a warm inviting atmosphere, more use might be made of the complexion flattering "pearl pink" lamps. These are supplied in 60W, 100W and 150W single coil ratings at a slightly extra cost.

Clear-glass lamps should definitely be banned, even in enclosing fittings, as the bright filament causes undesirable striation lines on the surface of the diffusing material. A pleasing combination of conventional components, not ultra contemporary in character, is the Reflector Crescent supplied by the AEI Lamp and Lighting Co., Ltd. The aluminium reflector is cream finished and the rod is in satin brass, copper bronze or chromium. This idea has been extended to cover other familiar shapes such as the Sphere, the Brandy Glass and the Acorn.

Contrast

CONTRASTING in style are the many fittings utilising numerous bare, small round or olive-shaped bulbs. These have a pearl or white "opal" finish and, without being garish, provide the stimulating feeling required perhaps in a restaurant or foyer.

Pendants, direct ceiling units and matching wall brackets are shown in the catalogues of various firms and often one particular style can be obtained with various numbers of lamps. Much depends on the dimensions of the interior but the fittings should not be allowed to dominate the decorative scheme.

An example of this trend in "flower" design, offered by GEC has a polished brass ceiling plate and rod with white enamelled conical caps and can be used with 25W or 40W small tungsten lamps.

THE IDEAL KINEMA SERVICE BUREAU

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IF you are a subscriber and require information on any of the items listed, or other subjects, fill in the form below and send it, together with precise information as to your needs, to The Ideal Kinema Service Bureau. We shall be pleased to forward the names of manufacturers or suppliers. We cannot, of course, provide professional consultancy services, but we can put you in touch with specialists who can help you with your problem.

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THE IDEAL KINEMA

PROJECTIONISTS' SCHOOL

By R. H. CRICKS, FBKS, FRPS

Electricity It is convenient to say that an accumulator or secondary battery stores electricity ; but this is quite wrong. As we learnt last month, the principle of the accumulator is that when current is drawn from it, chemicals are changed in character (but not consumed) ; by feeding current back into the battery the chemicals can be restored to their original condition.

The most generally used type of accumulator is the *lead-acid* type ; it is the basis of practically every secondary-lighting system. In each cell there are two plates made of lead in the form of grids, in the pockets of which red lead is pasted ; in large cells there may be a number of plates, alternately positive and negative, connected in parallel.

Between the plates are separators of wood or plastic, and the electrolyte consists of dilute sulphuric acid. Secondary-lighting batteries are generally contained in glass jars, while portable batteries are in vulcanite cases.

During the first charging of the cell, oxygen from the water in the electrolyte combines with the red lead of the positive plate and forms lead peroxide ; the other component of water is, of course, hydrogen (remember the formula H_2O) which penetrates into the negative plate, making it spongy. When the cell is discharged this action is reversed, and in addition sulphate from the sulphuric acid converts both plates into lead sulphate.

The plates have to be "formed" by several charges and discharges, after which each cell will have, when fully charged, an open-circuit voltage of about 2.7V., or on load 2.3V., which will gradually drop as the cell is discharged to 2.0V., and then slowly to 1.8V., beyond which the cell should not be further discharged. The specific gravity of the acid (that is to say, its weight in relation to water) should be about 1.22 to 1.25 when fully charged ; during discharge water is in fact added to it, the sp. gr. dropping to about 1.15.

The other type of accumulator is the *alkaline cell* ; it has certain advantages over the lead-acid type, but is less often used. In this, the positive element consists of nickel hydroxide, generally contained in pockets formed in a nickel plate, while the negative plate is of cadmium. Another type of cell used in America employs iron oxide for the negative plate. The electrolyte is caustic potash, a strong alkali which can cause painful burns.

The voltage per cell is only about 1.22, dropping to 1.1 on discharge ; this is the principal reason why, for a given voltage, an alkaline battery costs more than lead-acid ; but on the other hand, when a battery is needed to be charged and discharged in short periods the alkaline cell has definite advantages.

□ □ □

Projection Before finishing with the projector mechanism, let us look at various points in it which need particular attention, especially from the point of view of avoiding film damage.

Most important are perhaps the take-off and take-up frictions ; the purpose of these is to slip smoothly and without jerks, so that in the case of the take-off the film is drawn evenly off the spool by the top sprocket, and in the case of the take-up the film is drawn from the bottom sprocket and re-wound evenly. Snatching or jerking may break the film, or at least strain the perforations.

Frictions are made of various materials, often cork working against steel ; with most types it is important that they should *not* be oiled. The take-up friction must be so adjusted that it will just pull a full spool ; some 16 mm. projectors have an automatic compensating system which tightens as the reel gets larger, and it is strange that the same idea is not applied to the 35 mm. projector.

The film runs out of and into the spool boxes through fire traps, in each of which are two pairs of small rollers, quite close together ; these are surprisingly effective in stopping the spread of flame should a nitrate film catch fire. If these rollers are not to scratch the film, they must turn freely. In some projectors the fire traps are arranged to close tightly if the film should catch fire.

The film is held on the sprockets by means of jockey rollers, and these close down against stops. It is important that they should be held just off the film, and should not ride upon it, which will cause film damage. Naturally they must be accurately in line with the sprocket teeth.

In the gate the film runs between two pairs of polished steel runners, and if these are perfectly clean and polished there should be no risk of scratching the film. But when a green or new print is run, it is possible for the emulsion to be dragged off the film, deposited on the runner where it bakes hard and gouges a piece out of the film. To avoid this, new prints are nearly always waxed, but the gate should always be cleaned thoroughly between reels.

□ □ □

Sound We saw last month the importance of keeping the film running at a perfectly constant speed at the point in the sound head where it is scanned. Fortunately AC mains are to-day sufficiently constant for an induction type motor (whose speed is controlled chiefly by the frequency of the mains) to be quite satisfactory. But between the motor and the film there must necessarily be gears and sprocket teeth, which may cause flutter.

In early sound heads great care was taken to ensure that the sound sprocket ran at constant speed, by means of massive flywheels and spring buffers, isolating it from the gearing; but the film was drawn through the sound gate by the sprocket teeth, which gave rise to flutter. In every modern sound head the film is scanned not in a gate, but upon a rotating drum, on which it is isolated from the sprocket teeth.

Generally this drum is simply driven by the film, and carries on its shaft some form of flywheel.

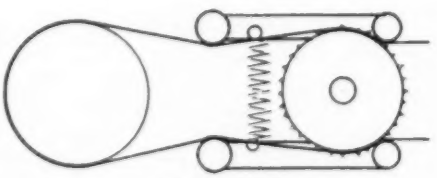

Diagram showing the free-loop and tight-loop methods of feeding film to and from the drum

The RCA rotary stabiliser, for instance, consists of a hollow shell fixed on the shaft of the drum, and fitting closely inside it is a flywheel turning freely on ball-bearings; between the two is a layer of oil.

In the BTH SUPA and Westrex sound heads, the scanning drum is driven through an electromagnetic system; a number of magnets driven from the gearing drag round a copper disc through the medium of the magnetic field, and this disc is mounted on the shaft of the scanning drum.

There are two methods by which the film is fed to and from the drum. In the free-loop system, the film path is so arranged that the film tends naturally to form a loop between the sprocket and the drum, and the drum runs so freely that this loop is completely slack. In the tight-loop system, the film is tensioned between the sprocket and the drum by means of rollers mounted on pivoted arms connected by a spring, their movement heavily damped.

It is most important that there shall be no vibration between the optical unit and the scanning drum. In the GK Type 378 sound head, the whole of the optical system is built as a pre-focused unit, mounted on rubber cushions. A similar construction is used in the RCA head.

□ □ □

Homework

1. A battery of lead-acid cells is required to maintain a constant on-load voltage of 110V. at all states of discharge down to 1.8V. per cell. Suggest how this could be done?

2. A spool has a hub diameter of 5 in. ; when it has taken up a double-reel of film the outside diameter of the film is 14 in. What will be the speed of the spool, in r.p.m., at the beginning and end of the reel ?

3. Explain the term "96 c/s flutter." What is its probable cause, and what is its effect ?

□ □ □

Answers to Last Month's Homework

1. $R = \frac{E}{I}$ *or* $\frac{E_1 - E_2}{R}$

$$= \frac{1.6 - 1.3}{0.5} = 0.6 \text{ ohm.}$$

2. Because it slides on its shaft to provide shutter phasing compensation in racking.

3. The CinemaScope aperture is higher than the standard aperture (.715 in. against .600 in.) therefore in theory the twilight period will be increased and a larger angle of cover blade should be needed; but actually the increase is negligible.

4. 90 ft. per minute = 24 frames per second.

$$1{,}000 \times \frac{25}{24} = 1{,}042 \text{ c/s.}$$

EMULSION POLISH FOR TILES

A NEW emulsion polish specially made for thermoplastic tiles cleans and polishes the floor in the same process. No burnishing is required and an anti-slip surface is obtained. It is made by Silexine Paints, Ltd.

Glint is the trade name. The floor has to be cleaned and two coats given only for the first application. Maintenance simply calls for touching-up or re-applying one coat when required. A soft cloth or polisher can be used to rub out scuff marks, and normally, black rubber marks can be removed by gently rubbing with a soft cloth soaked in the polish.

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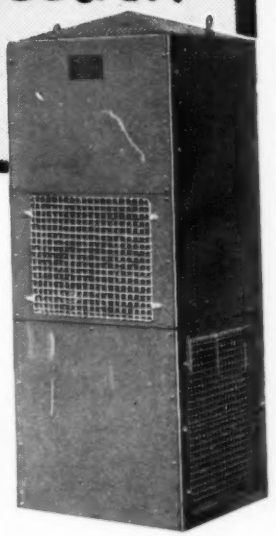

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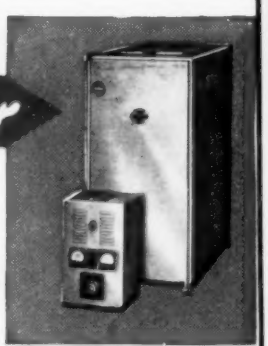

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